

(3) The helicopter in ground effect at a height consistent with normal takeoff procedures.

(c) For each helicopter, the out-of-ground effect hovering performance must be determined over the ranges of weight, altitude, and temperature for which certification is requested with takeoff power.

(d) For rotorcraft other than helicopters, the steady rate of climb at the minimum operating speed must be determined over the ranges of weight, altitude, and temperature for which certification is requested with—

- (1) Takeoff power; and
- (2) The landing gear extended.

[Doc. No. 24802, 61 FR 21898, May 10, 1996; 61 FR 33963, July 1, 1996]

#### § 29.51 Takeoff data: general.

(a) The takeoff data required by §§ 29.53, 29.55, 29.59, 29.60, 29.61, 29.62, 29.63, and 29.67 must be determined—

(1) At each weight, altitude, and temperature selected by the applicant; and

(2) With the operating engines within approved operating limitations.

(b) Takeoff data must—

(1) Be determined on a smooth, dry, hard surface; and

(2) Be corrected to assume a level takeoff surface.

(c) No takeoff made to determine the data required by this section may require exceptional piloting skill or alertness, or exceptionally favorable conditions.

[Doc. No. 5084, 29 FR 16150, Dec. 3, 1964, as amended by Amdt. 29-39, 61 FR 21899, May 10, 1996]

#### § 29.53 Takeoff: Category A.

The takeoff performance must be determined and scheduled so that, if one engine fails at any time after the start of takeoff, the rotorcraft can—

- (a) Return to, and stop safely on, the takeoff area; or
- (b) Continue the takeoff and climbout, and attain a configuration and airspeed allowing compliance with § 29.67(a)(2).

[Doc. No. 24802, 61 FR 21899, May 10, 1996; 61 FR 33963, July 1, 1996]

#### § 29.55 Takeoff decision point (TDP): Category A.

(a) The TDP is the first point from which a continued takeoff capability is assured under § 29.59 and is the last point in the takeoff path from which a rejected takeoff is assured within the distance determined under § 29.62.

(b) The TDP must be established in relation to the takeoff path using no more than two parameters; e.g., airspeed and height, to designate the TDP.

(c) Determination of the TDP must include the pilot recognition time interval following failure of the critical engine.

[Doc. No. 24802, 61 FR 21899, May 10, 1996]

#### § 29.59 Takeoff path: Category A.

(a) The takeoff path extends from the point of commencement of the takeoff procedure to a point at which the rotorcraft is 1,000 feet above the takeoff surface and compliance with § 29.67(a)(2) is shown. In addition—

(1) The takeoff path must remain clear of the height-velocity envelope established in accordance with § 29.87;

(2) The rotorcraft must be flown to the engine failure point; at which point, the critical engine must be made inoperative and remain inoperative for the rest of the takeoff;

(3) After the critical engine is made inoperative, the rotorcraft must continue to the takeoff decision point, and then attain  $V_{TOSS}$ ;

(4) Only primary controls may be used while attaining  $V_{TOSS}$  and while establishing a positive rate of climb. Secondary controls that are located on the primary controls may be used after a positive rate of climb and  $V_{TOSS}$  are established but in no case less than 3 seconds after the critical engine is made inoperative; and

(5) After attaining  $V_{TOSS}$  and a positive rate of a climb, the landing gear may be retracted.

(b) During the takeoff path determination made in accordance with paragraph (a) of this section and after attaining  $V_{TOSS}$  and a positive rate of climb, the climb must be continued at a speed as close as practicable to, but not less than,  $V_{TOSS}$  until the rotorcraft is 200 feet above the takeoff surface.

## § 29.60

## 14 CFR Ch. I (1–1–06 Edition)

During this interval, the climb performance must meet or exceed that required by § 29.67(a)(1).

(c) During the continued takeoff, the rotorcraft shall not descend below 15 feet above the takeoff surface when the takeoff decision point is above 15 feet.

(d) From 200 feet above the takeoff surface, the rotorcraft takeoff path must be level or positive until a height 1,000 feet above the takeoff surface is attained with not less than the rate of climb required by § 29.67(a)(2). Any secondary or auxiliary control may be used after attaining 200 feet above the takeoff surface.

(e) Takeoff distance will be determined in accordance with § 29.61.

[Doc. No. 24802, 61 FR 21899, May 10, 1996; 61 FR 33963, July 1, 1996, as amended by Amdt. 29–44, 64 FR 45337, Aug. 19, 1999]

### § 29.60 Elevated heliport takeoff path: Category A.

(a) The elevated heliport takeoff path extends from the point of commencement of the takeoff procedure to a point in the takeoff path at which the rotorcraft is 1,000 feet above the takeoff surface and compliance with § 29.67(a)(2) is shown. In addition—

(1) The requirements of § 29.59(a) must be met;

(2) While attaining  $V_{TOSS}$  and a positive rate of climb, the rotorcraft may descend below the level of the takeoff surface if, in so doing and when clearing the elevated heliport edge, every part of the rotorcraft clears all obstacles by at least 15 feet;

(3) The vertical magnitude of any descent below the takeoff surface must be determined; and

(4) After attaining  $V_{TOSS}$  and a positive rate of climb, the landing gear may be retracted.

(b) The scheduled takeoff weight must be such that the climb requirements of § 29.67 (a)(1) and (a)(2) will be met.

(c) Takeoff distance will be determined in accordance with § 29.61.

[Doc. No. 24802, 61 FR 21899, May 10, 1996; 61 FR 33963, July 1, 1996]

### § 29.61 Takeoff distance: Category A.

(a) The normal takeoff distance is the horizontal distance along the takeoff path from the start of the takeoff to

the point at which the rotorcraft attains and remains at least 35 feet above the takeoff surface, attains and maintains a speed of at least  $V_{TOSS}$ , and establishes a positive rate of climb, assuming the critical engine failure occurs at the engine failure point prior to the takeoff decision point.

(b) For elevated heliports, the takeoff distance is the horizontal distance along the takeoff path from the start of the takeoff to the point at which the rotorcraft attains and maintains a speed of at least  $V_{TOSS}$  and establishes a positive rate of climb, assuming the critical engine failure occurs at the engine failure point prior to the takeoff decision point.

[Doc. No. 24802, 61 FR 21899, May 10, 1996]

### § 29.62 Rejected takeoff: Category A.

The rejected takeoff distance and procedures for each condition where takeoff is approved will be established with—

(a) The takeoff path requirements of §§ 29.59 and 29.60 being used up to the TDP where the critical engine failure is recognized and the rotorcraft is landed and brought to a complete stop on the takeoff surface;

(b) The remaining engines operating within approved limits;

(c) The landing gear remaining extended throughout the entire rejected takeoff; and

(d) The use of only the primary controls until the rotorcraft is on the ground. Secondary controls located on the primary control may not be used until the rotorcraft is on the ground. Means other than wheel brakes may be used to stop the rotorcraft if the means are safe and reliable and consistent results can be expected under normal operating conditions.

[Doc. No. 24802, 61 FR 21899, May 10, 1996, as amended by Amdt. 29–44, 64 FR 45337, Aug. 19, 1999]

### § 29.63 Takeoff: Category B.

The horizontal distance required to take off and climb over a 50-foot obstacle must be established with the most unfavorable center of gravity. The takeoff may be begun in any manner if—

(a) The takeoff surface is defined;